

No. 842,736.

PATENTED JAN. 29, 1907.

U. WEDGE.  
ORE HEATING AND DRYING DEVICE FOR FURNACES.

APPLICATION FILED FEB. 14, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

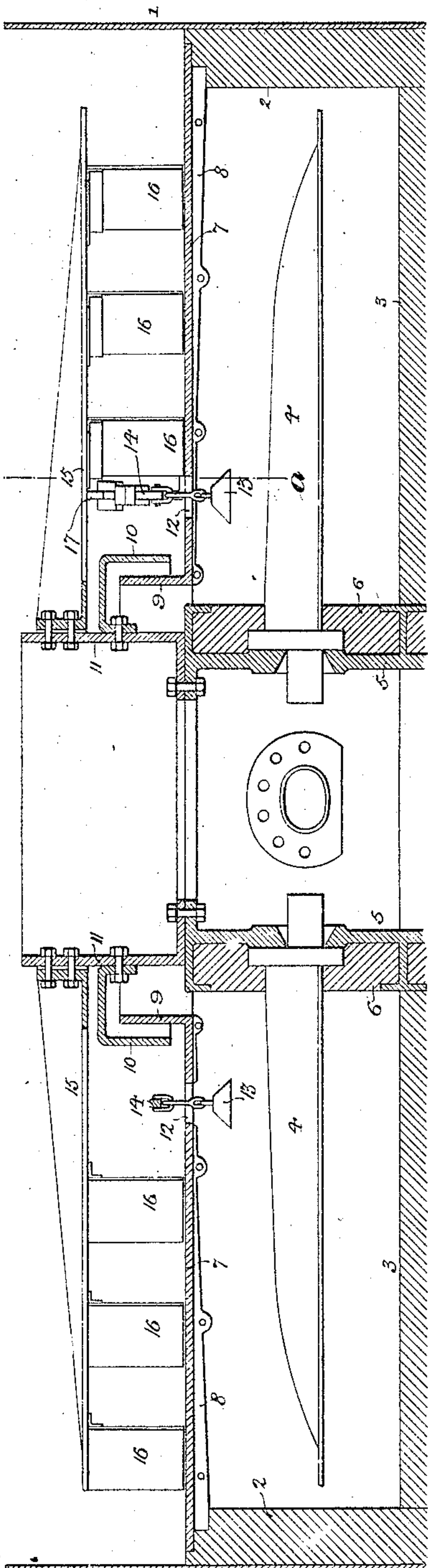


Fig. 3.

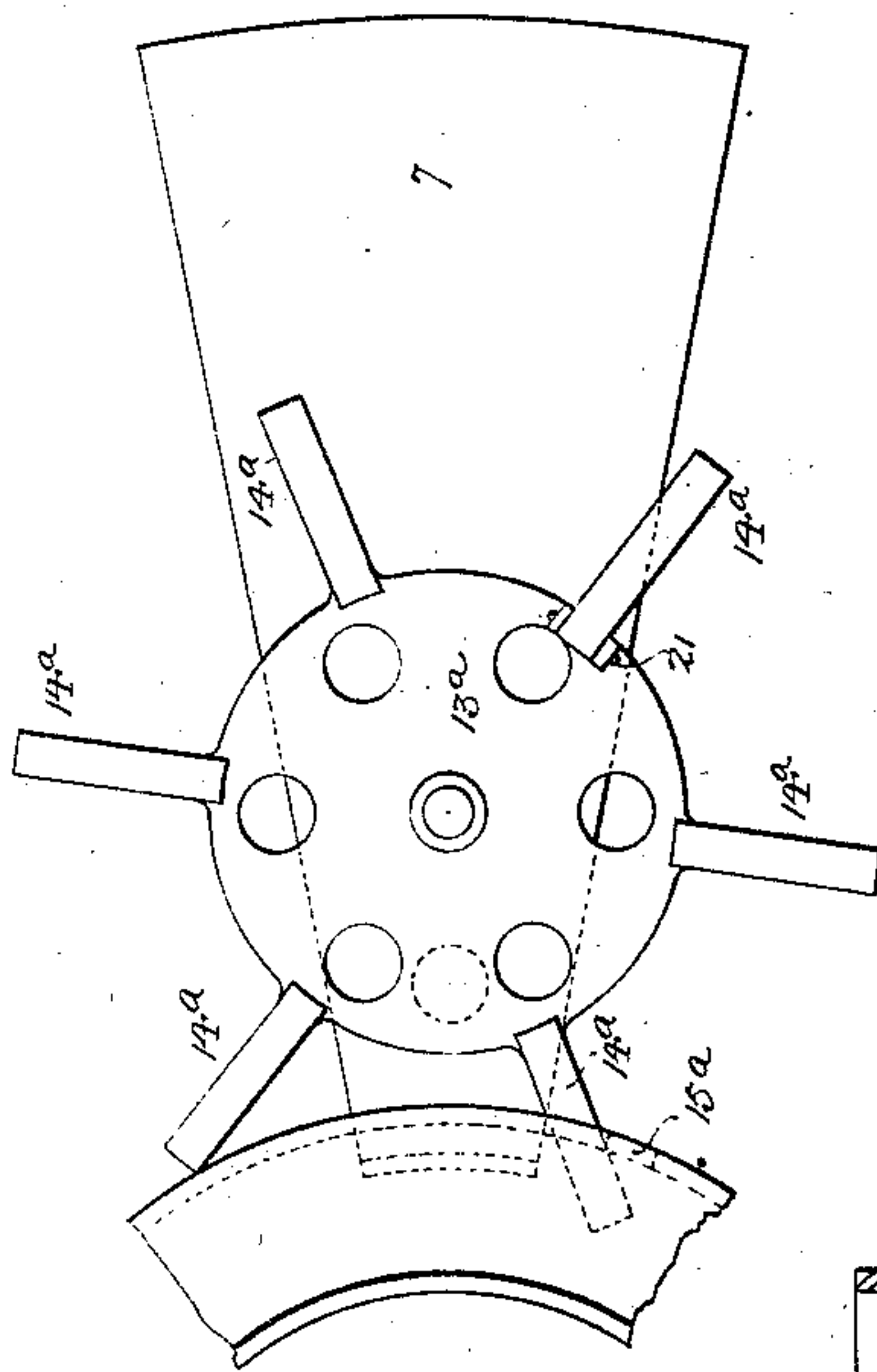
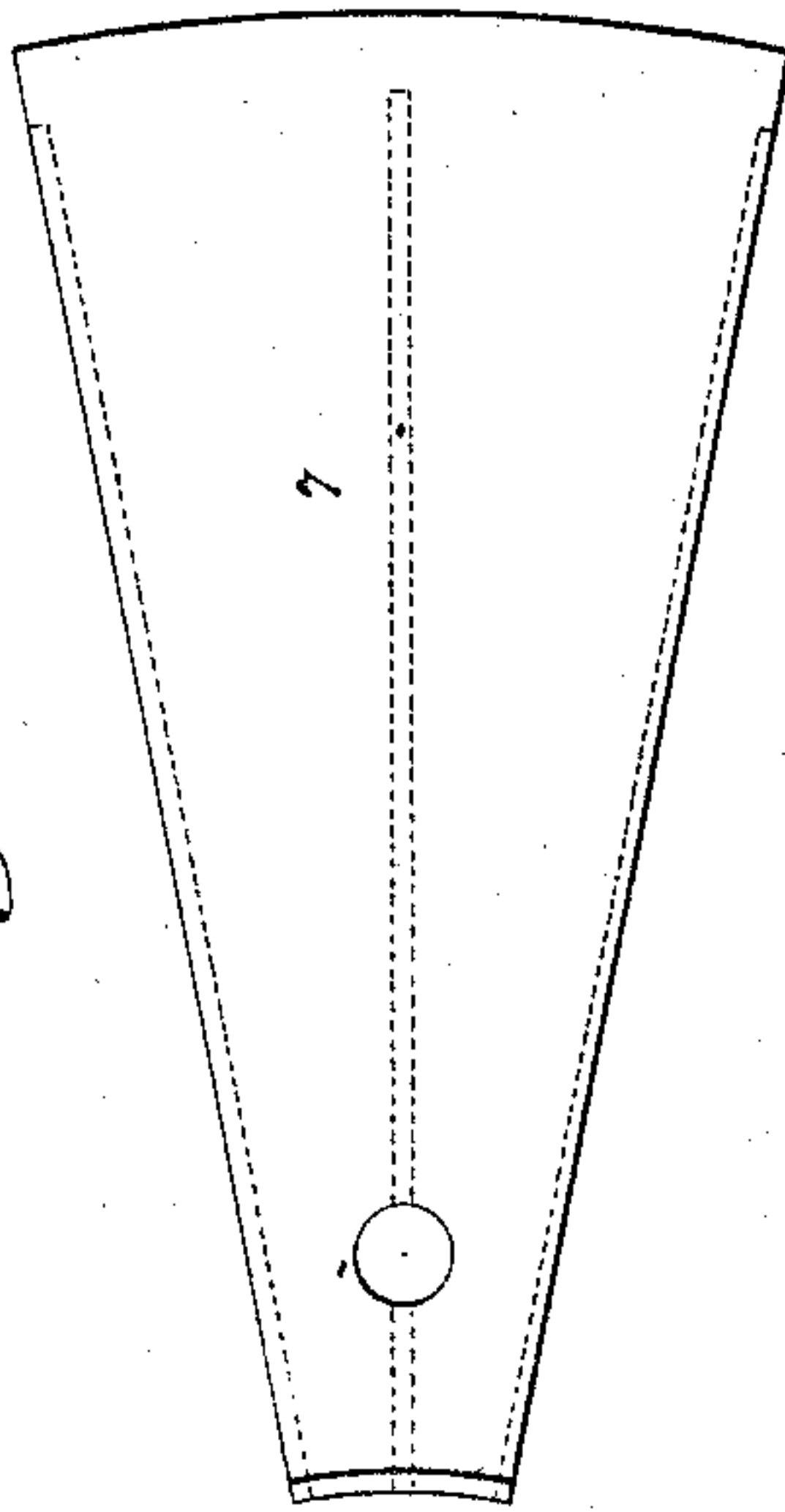
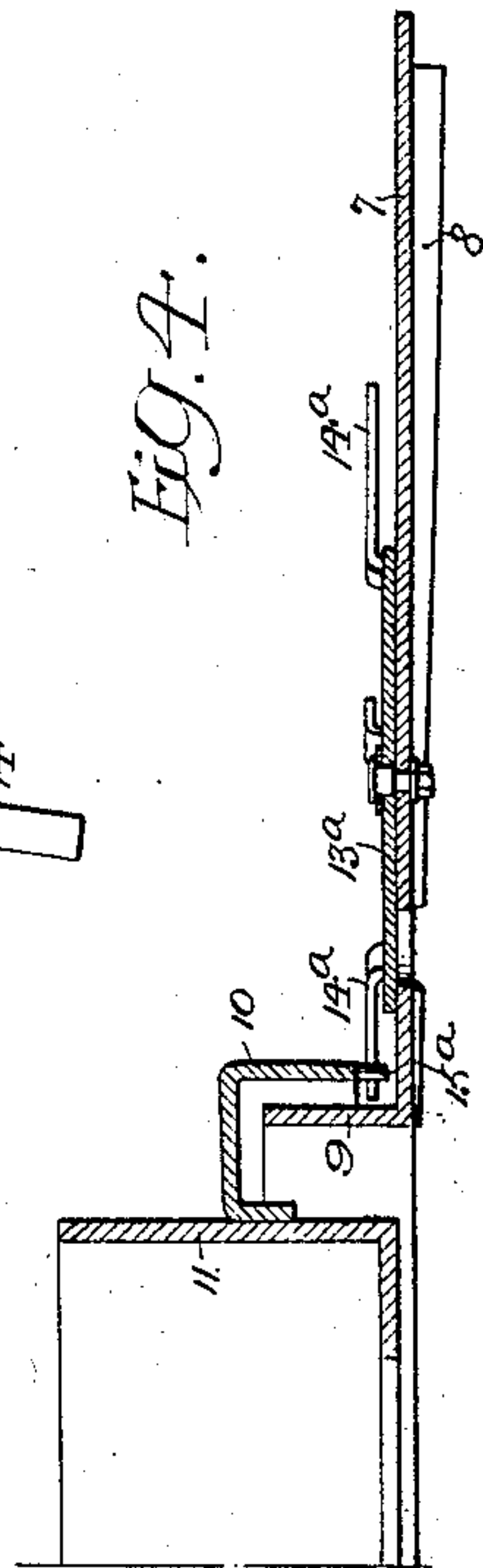


Fig. 5.

Fig. 4.



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No. 842,736.

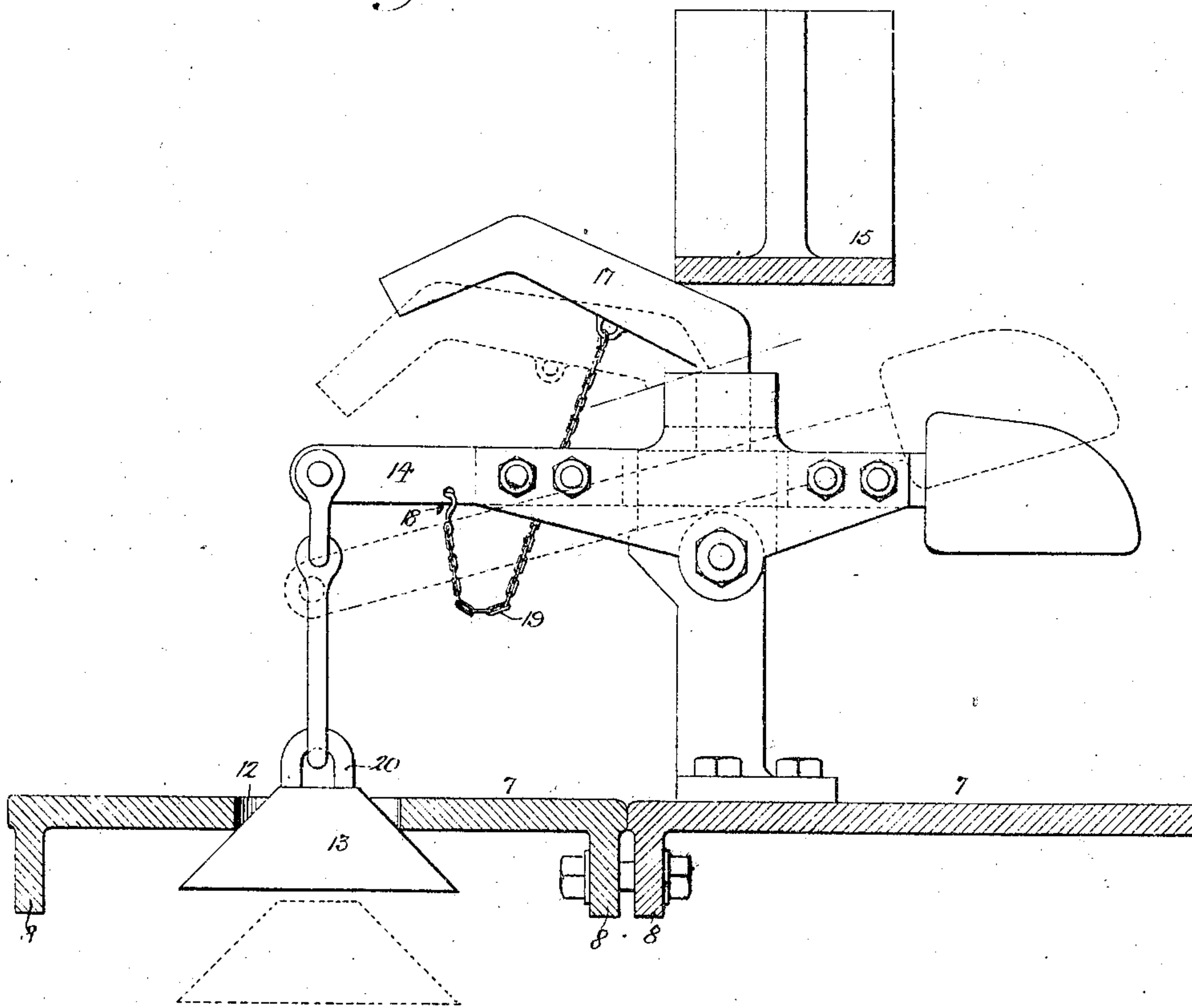
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2 SHEETS—SHEET 2.

Fig. 2.



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# UNITED STATES PATENT OFFICE.

UTLEY WEDGE, OF ARDMORE, PENNSYLVANIA.

## ORE HEATING AND DRYING DEVICE FOR FURNACES.

No. 842,736.

Specification of Letters Patent.

Patented Jan. 29, 1907.

Application filed February 14, 1906. Serial No. 301,084.

*To all whom it may concern:*

Be it known that I, UTLEY WEDGE, a citizen of the United States, residing in Ardmore, Pennsylvania, have invented certain  
5 Improvements in Ore Heating or Drying Devices for Furnaces, of which the following is a specification.

My invention relates to that class of furnaces for desulfurizing, calcining, chloridizing, &c., which utilize the heat of the roof or top plate for the purpose of drying the ore preparatory to the feeding of the same into the working chamber of the furnace, the object of my invention being to provide simple  
15 and effective means for causing the automatic feeding of the dry ore onto the upper table or shelf of the working chamber.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of sufficient of the upper portion of an ore roasting or desulfurizing furnace to illustrate my present invention. Fig. 2 is a transverse section, on a larger scale, of part of the furnace on the line *a a*, Fig. 1. Fig. 3 is a plan view of one  
25 of the plates or sections of the furnace top or roof. Fig. 4 is a sectional view illustrating a modification of the invention, and Fig. 5 is a plan view of the same.

So far as the general construction of the furnace is concerned it may be similar to many of those at present in use.

In the drawings I have only shown the upper portion of the furnace, 1 representing the sheet-metal outer casing with refractory lining 2, and 3 representing the upper table or shelf upon which the ore is deposited, said ore being spread or conveyed over this shelf by means of rabblers, blades, or vanes carried by stirrer-arms 4, which are secured to a central rotating hollow shaft 5, also protected from the heat by means of a refractory sheathing 6.

The top plate or roof of the furnace is composed of metal plates 7, preferably of segmental form, as shown in Fig. 3, these plates being provided on the under side with radial stiffening or strengthening ribs 8, the ribs at the edges of the plate being also used for securing the adjoining plates or sections of the  
45 roof together, so that when they are properly united they form a rigid structure whose peripheral portion is properly mounted upon the

top of the fire-brick lining 2 of the furnace-casing. Where the heat would be in excess of that required or desired in drying the material, the top of the furnace may be constructed in whole or part of brick, which will diminish the amount of heat applied or absorbed in the heating and drying process on top of furnace.

The metallic portion of the furnace-casing is carried above the roof-plates 7, and the latter are provided at their inner ends with flanges 9, whereby there is formed on the roof an annular chamber or trough for the reception of the green ore which is to be dried before being fed into the uppermost of the working chambers of the furnace, a flanged bar 10 of inverted-L shape being secured to an upward continuation 11 of the central rotating shaft 5 of the furnace, as shown in Fig. 1, in order to cooperate with the flange 9 of the roof-sections and with the mass of ore on the roof to form a seal and prevent the escape of gases or vapors from the working chamber of the furnace at that point.

In one or more of the roof-sections 7, adjacent to the inner portion of the latter, is formed a feed-opening 12, with which cooperates a bell-valve 13, suspended by a rod, link, chain, wire, or equivalent device from one arm of a lever 14, which is pivoted to a suitable bearing on the top of the roof-section and has a counterweighted arm tending to normally lift the bell-valve 13, and thereby close the feed-opening 12.

Secured to and projecting from the upward continuation 11 of the central shaft of the furnace are one or more radial arms 15, which are provided with depending blades or vanes 16, so disposed as to stir the mass of ore deposited upon the roof of the furnace and gradually feed the same inwardly or toward the center of the furnace, the further supplies of green ore being fed onto the roof at a point adjacent to the outer wall in order that they may be slowly traversed across the roof and dried by the heat of the same during their passage, quick drying being insured when the metallic roof-plates 7 are directly in contact with the heated gases and products of combustion in the upper chamber of the furnace. The feed-openings may be located around the outer portion of the drying-floor,



in which case the material will be deposited near the center of the said floor and conveyed outwardly to said feed-openings. The dried grains or particles of ore finally reach the feed opening or openings 12, and if the valve 13 is open pass through said feed opening or openings into the upper chamber of the furnace. It is not advisable, however, to provide for a continuous flow of the ore into the furnace, and for this reason the valve 13 of each feed-opening is only opened for a length of time on each rotation of the central shaft of the furnace sufficient to permit the desired inflow of material and then closed before any material volume of furnace-gas has had an opportunity to escape. Such opening is in the present instance effected by contact of the lower portion of the radial arm 15 with the back of a finger 17 on the lever 14, which finger, as shown in Fig. 2, normally projects into the path of the arm 15, and when struck by the latter is depressed so as to open the valve 13 and hold it in such depressed position until the arm passes out of contact with the finger, whereupon the valve is raised to its normal or closed position by the action of the counterweighted arm of the lever, the two positions being illustrated, respectively, by full and dotted lines in Fig. 2.

Other means of attaining the object of my invention will, however, readily suggest themselves to those skilled in the art, and in Figs. 4 and 5 I have illustrated one such modification, the valve in this case consisting of a disk 13<sup>a</sup>, axially pivoted upon the top of one of the roof-sections and having projecting arms 14<sup>a</sup>, which are successively struck and moved forwardly by depending pins or lugs 15<sup>a</sup> on the rotating flange 10. When the bell-valve 13 is open, a flow of powdered or granular ore through the opening 12 and over the valve is effected by the action of the adjacent blades 16 on the arm 15, and this serves to seal said opening so effectively as to prevent any material escape of gases through the same. When it is desired to arrest the feeding of ore into the furnace, a hook 18 at the outer-end of a chain 19, depending from the finger 17, may be engaged with an eye 20 on the valve 13 in order to maintain such finger in a depressed position where it will be out of the path of the arm 15, and will not, therefore, be struck and depressed by said arm as the latter is carried around with the rotating shaft of the furnace, and in order to attain the same result with the valve shown in Figs. 4 and 5 one of the arms 14<sup>a</sup> of said valve may be pivoted, as at 21, so as to be thrown backwardly out of the path of the lugs 15<sup>a</sup>.

I claim—

1. An ore-roasting or like furnace having a metallic top or roof plate composed of radially-ribbed segmental sections secured to-

gether and resting upon the walls of the furnace.

2. An ore-roasting or like furnace having a roof-plate with an opening therein adjacent to the central portion of the plate and communicating with the upper chamber of the furnace, an intermittently-operating valve for alternately opening and closing said opening, a central rotating shaft, and a projecting arm thereon having stirring vanes or blades for feeding the ore from the outer or peripheral portion of the roof-plate toward the center of the same.

3. An ore-roasting or like furnace having at the top, a dry-ore chamber, with an opening therein communicating with the upper chamber of the furnace, a vertically-movable valve coacting with said opening, and means carried by a rotating element of the furnace for imparting movement to said valve.

4. An ore-roasting or like furnace having at the top, a dry-ore chamber, with opening therein communicating with the upper chamber of the furnace, a vertically-movable valve coacting with said opening, an arm carried by a rotating member of the furnace, and a lever carrying the valve and having a portion normally projecting into the path of said arm so as to be struck and moved thereby.

5. An ore-roasting or like furnace having at the top, a dry-ore chamber, with opening therein communicating with the upper chamber of the furnace, a vertically-movable valve coacting with said opening, an arm carried by a rotatable member of the furnace, and a lever having a portion to be struck by said rotating arm to move the valve in one direction and an arm provided with a counterweight for restoring the valve to its normal position.

6. An ore-roasting or like furnace having at the top a dry-ore chamber with opening therein communicating with the upper chamber of the furnace, a movable valve for said opening, means carried by a rotating member of the furnace for moving said valve, and means for freeing the valve from the control of said operating device.

7. An ore-roasting or like furnace having at the top a dry-ore chamber with opening therein, communicating with the upper chamber of the furnace, a vertically-movable valve coacting with said opening, an arm carried by a rotating member of the furnace and a valve-carrying lever having a portion projecting into the path of said arm in order that it may be struck thereby to move the valve, and means for varying the relation of the valve and the lever, in one of which relations, the lever is held free from contact with the arm.

8. An ore-roasting or like furnace having

at the top a dry-ore chamber with an opening therein communicating with the upper chamber of the furnace, a movable valve for said opening, and means for feeding ore into the opening when the valve is open in order to seal said valve.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

UTLEY WEDGE.

Witnesses:

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JOS. H. KLEIN.